Atochem North America = Permit

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

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SURFACE WATER QUALITY DIVISION
SOUTHEAST MICHIGAN DISTRICT OFFICE

April 19, 1991

TO: Richard Powers, Assistant Chief
Surface Water Quality Division

FROM: Roger Jones
Great Lakes and Environmental Assessment Section
Surface Water Quality Division

SUBJECT: 2,4-di-tert-pentylphenol (2,4-DP) Review
Atochem North America, Inc.
NPDES Permit No. MI0002381

The current NPDES permit for Atochem was issued on September 15, 1988, and is based on the company's March 31, 1987, application. This permit expires on October 1, 1992, and authorizes the company to discharge a maximum of 14,720,000 gpd of: organic and inorganic process wastewater, barometric condenser cooling water, boiler blowdown, noncontact cooling water and stormwater runoff from outfall 001 (formerly 006) to the Detroit River Trenton Channel via Monguagon Creek. Wastewater treatment prior to discharge consists of settling and skimming (in a pond) followed by pH neutralization and discharge to a final skimming and settling pond.

Atochem's March 31, 1987, NPDES permit application did not specify the use or discharge of 2,4-DP. Item 6F of the application concerning the possibility of discharge of pollutants (from application Table VA), indicated that certain compounds are used as raw materials and produced at Atochem. It is further indicated that if equipment malfunctions or there are spills, the following raw materials or products could be discharged: Butylamine, carbon disulfide, Diethylamine, Dimethylamine, Ethanolamine, Methyl mercaptan, Monoethylamine, Monomethylamine, Propylene oxide, and Triethylamine.

Item 7 of the application concerning critical materials, toxic pollutants, and hazardous substances in the discharge, lists the following: total phenols, total organic nitrogen, sulfate, oil and grease, cyanide, total phosphorus, hypochlorite, chlorine, and hydrogen sulfide.

Atochem's NPDES permit requires the monitoring of numerous compounds. However, 2,4-DP is not among them.

Gary Hurlburt advises that according to the most recent available U.S. EPA TSCA reports, Atochem (Pennwalt at the time) in 1986 produced 3,170,000 pounds of 2,4-DP. The 1990 inventory is currently being computerized and 2,4-DP information was not readily available. However, Roy Schrameck has indicated that for economic reasons, 2,4-DP has not been produced at Atochem for the last two years.

Carp (whole tissue) and sediment collected from the vicinity of the mouth of Monguagon Creek in 1985 were contaminated with 2,4-DP (Shiraishi et al. 1989). Carp tissue levels of 2,4-DP in this study were as high as 140 ppm with sediment levels up to 130 ppm. It was concluded in the study that the source of 2,4-DP (and 4-P) in the carp was "apparently the chemical plant where these chemicals are manufactured".

Excerpts from a study strategy by Ronald Hites, Indiana University, (presented by Donna Carter at the IAGLR Conference at Madison, Wisconsin in June of 1989) indicated that 2,4-DP was only produced at one location in the entire Great Lakes area. Preliminary results cited in the aforementioned strategy also indicated that the presence of 2,4-DP roughly 400 km from its source indicates that some of the contaminated sediment from the Trenton Channel is being transported across Lake Erie.

Sediment sampling studies conducted in 1986 and 1987 showed 2,4-DP to be present at the mouth of Monguagon Creek (Furlong et al. 1988). The report of this study indicates that the "Pennwalt plant on Monguagon Creek is the sole producer of this compound in the Great Lakes area; thus, this compound seems to have a single point source".

Preliminary Rule 57(2) calaculations are:

ACV: 0.22 ug/l
FAV: 9.8 ug/l
HLSC: 0.02 ug/l - 2 ug/l

However, these calculations are based on limited data and QSAR estimations.

Through our on-line literature search capabilities we have found the LD50 reference below, an analytical reference under sediments and water, an analytical reference under carp, and a QSAR evaluation for which all results are projected/predicted. This probably represents the extent of the publicly available data base.

The only toxicity data available is an unverified LD50 of 330 mg for rats and an eye irritation study in rabbits of 100 mg as "moderate" (Registry of Toxic Effects of Chemical Substances). This information has been ordered.

Using maximum water solubility and the 140 ppm 2,4-DP found in carp, the lowest BCF would be about 1700. This generates an acceptable water concentration of about 2 ug/l or about 3.6 mg/kg fish tissue concentration.

A QSAR estimated BCF is 367,000. However, this may be an overestimate, due to the high log P (6.96). Using a BCF of 100,000, generates an estimated acceptable concentration in water of 0.02 ug/l and about the same (3.6 mg/kg) fish tissue concentration as above.

Please let me know if you have any questions.

cc: Jim Grant
Bill Creal
Roy Schrameck

Roger Jones

LITERATURE CITED

Furlong, E.T., D.S. Carter and R.A. Hites. 1988. Organic Contaminants in Sediments from the Trenton Channel of the Detroit River, Michigan. J. Great Lakes Res. 14(4):489-501.

Shiraishi, H., D.S. Carter and R.A. Hites. 1989. Identification and Determination of Tert-Alkylphenols in Carp from the Trenton Channel of the Detroit River, Michigan, USA. Biomedical and Environmental Mass Spectometry, Vol. 18 478-483.